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Laparoscopic Bilateral Adrenalectomy With the Use of a Single Midline Hand-assist Port

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ABSTRACT

Indications for bilateral adrenalectomy are rarely present in patients with Cushing's syndrome. The laparoscopic approach to adrenalectomy provides a postoperative course that compares favorably with that of open adrenalectomy, and the hand-assisted technique may provide an additional alternative to the open approach in performing bilateral adrenalectomy.

Key Words: Hand-assisted laparoscopy, Cushing's syndrome.

INTRODUCTION

Indications for bilateral adrenalectomy are rarely present in patients with Cushing's syndrome. The laparoscopic approach to adrenalectomy provides a postoperative course that compares favorably with that of open adrenalectomy,[1] and the hand-assisted technique may provide an additional alternative to the open approach in performing bilateral adrenalectomy.[2]

Bilateral macronodular hyperplasia is a rare cause of Cushing's Syndrome, accounting for approximately 1% to 2% of cases.[3] This specific entity is described within the category of corticotropin-independent adrenocortical disease and is characterized by elevated plasma cortisol levels unresponsive to dexamethasone, absence of sella or pituitary fossa abnormalities, and marked enlargement of the adrenal glands with grossly apparent nodular hyperplasia of the cortex. After thorough metabolic and radiographic evaluation, a 44-year-old female with bilateral macronodular hyperplasia underwent laparoscopic bilateral adrenalectomy with the use of a midline hand-assist port.

CASE REPORT

The case of a 44-year-old female with Cushing's Syndrome and bilateral macronodular hyperplasia is presented. This patient presented with hypertension, frequent flushing and sweating, and a 30-pound weight gain. Further evaluation revealed a history of easy bruising, abdominal obesity, and proximal muscle wasting. An endocrine workup showed a plasma cortisol of 22 µg/dL (normal, 6.0 to 17 µg/dL), a 24-hour urinary cortisol of 169.9 µg (adult reference range, 2.0 to 42.4 µg/dL), and plasma corticotropin of <2 pg/mL (normal, 9 to 52 pg/mL). Serum cortisol was not suppressed with either low- (2 mg) or high- (8 mg) dose dexamethasone. Magnetic resonance imaging (MRI) did not show any pituitary abnormality. An MRI of the abdomen revealed left and right adrenal masses, 4.8 cm and 3.2 cm at the greatest diameter, respectively **(Figure 1)**.

After a lengthy discussion of all management options, the patient consented to laparoscopic bilateral adrenalectomy, and the hand-assist device was used (Smith and Nephew,

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Andover, MA). The patient was prepared with a clear liquid diet on the day preceding surgery and both mechanical and antibiotic bowel preparations. The patient had pneumatic compression stockings placed immediately upon entry into the operating room. After induction of general endotracheal anesthesia, the patient was placed in a modified dorsal lithotomy position with hips flexed 15°, and both nasogastric tube and Foley catheter were placed. The surgeon took advantage of the midline position at the patient's perineum. Video monitors were placed at both the patient's left and right shoulders. A 7-cm incision was made in the exact midline caudad from the umbilicus with the electrocautery on a pure cut through the cutaneous layer, and coagulation thereafter **(Figure 2)**. The peritoneal cavity was entered, and after confirming the absence of underlying anterior abdominal wall adhesions, the hand-assist device was placed and the cuff inflated. A 10-mm port was placed at the level of the umbilicus in the anterior axillary line, and a second 10-mm port was placed medial to this at the level of the umbilicus in the midclavicular line. Additional equipment included a 30° laparoscope (US Surgical, Norwalk, CT), Harmonic scalpel (Ethicon, Sommers, NJ), in-line stapling device, locking small and large clips (Weck Closure Systems, Research Triangle Park, NC), and a laparoscopic suction/irrigating device. Both the left and right adrenal masses were approached via an anterior transperitoneal approach. Access to the left adrenal mass was gained through the colonic mesentery lateral to the inferior mesenteric vein. The adrenal mass was palpated with the operating left hand **(Figure 3)** and presented to the dissecting laparoscopic instrument **(Figure 4)**. The left adrenal vein was doubly clipped at its entry into the left renal vein and the specimen delivered. Right adrenalectomy was then performed. Though the classic description of hand-assist port placement for access to the right kidney and adrenal is one of muscle splitting in the right lower quadrant, we utilized the already placed lower midline hand-port site. Ports were placed in mirror image to those for left-sided dissection, and an additional port was placed in the

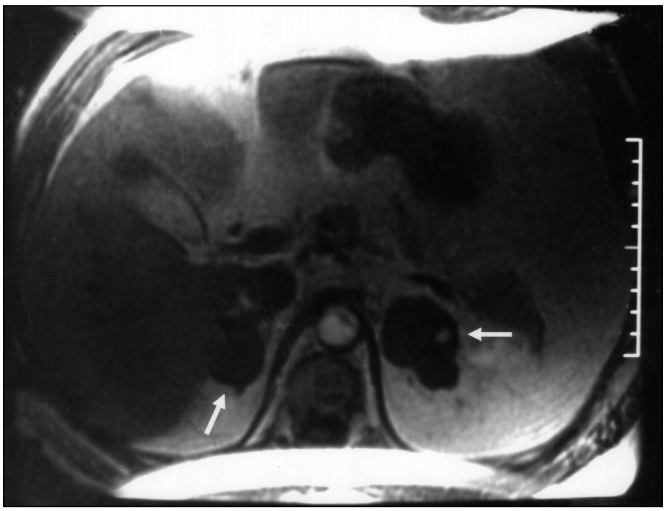

Figure 1. MRI of the abdomen (T1, in phase) showing bilateral adrenal masses (arrows).

Figure 2. Seven-centimeter infraumbilical midline hand-port incision.

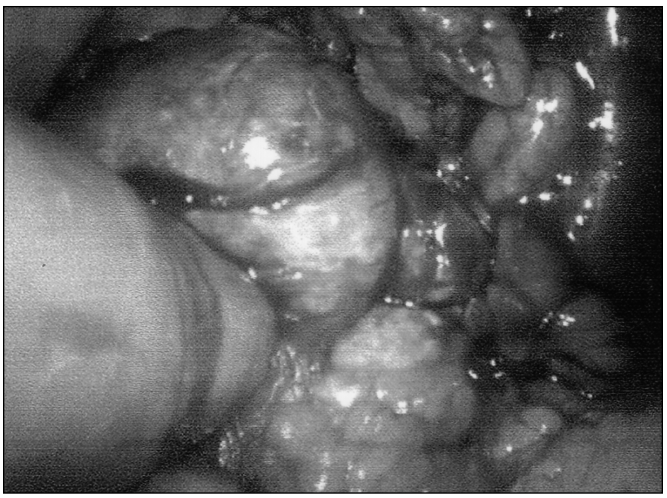

Figure 3. Left adrenal mass palpated with the operating left hand.

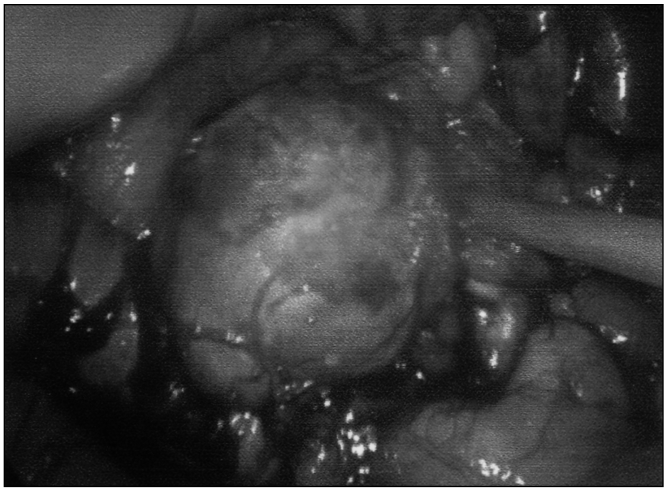

Figure 4. Left adrenal mass being presented to the laparoscopic instrument.

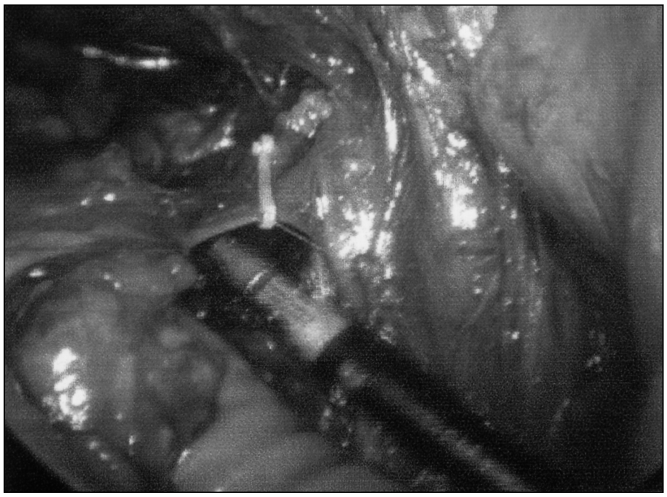

Figure 5. Weck clip application to right adrenal vein.

midupper quadrant to retract the liver **(Figure 5)**. The adrenal vein on the right is described as being short. Gentle retraction on the right adrenal gland afforded by the surgeon's hand allowed for maximal identification of its extent and clip application for safe vascular control **(Figure 5)**. The specimen was then delivered. The left adrenal mass was removed in 120 minutes and the right in an additional 90 minutes. Blood loss was minimal. A drain was not placed. Neither intraoperative nor postoperative complications occurred, and the patient was discharged on the morning of the 4th postoperative day. At the time of discharge, the patient resumed a usual diet and postoperative pain was managed with a nonnarcotic medication (Vioxx, 50 mg P.O. daily, Merck & Co., Whitehouse Station, NJ).

DISCUSSION

The advent of laparoscopy has provided an alternative to open surgery in managing some patients with complex disorders. As in the present case, the potential for decreased postoperative morbidity and shorter convalescence is real. Several points relevant to this case are worth noting. The patient was positioned in a modified dorsal lithotomy position. This allowed the surgeon to come up to the perineum, allowing a midline approach to a near midline organ bilaterally, and allowed improved hand-oscopic access to the higher, left adrenal gland. The midline hand-assist port served well for access to both the left and right adrenal masses. The patient was placed on an inflatable beanbag, with the sides built up to prevent side to side sliding when rotated. The adrenal vein, particularly on the right, is described as being short. Gentle retraction on the right adrenal gland afforded by the surgeon's hand allowed for maximal identification of its extent and clip application for safe vascular control.

The advent of hand-assisted laparoscopy provides a new alternative in managing patients with select adrenal disorders, and warrants further exploration.[4] We have applied this approach in performing bilateral laparoscopic adrenalectomy in the rare case of Cushing's syndrome secondary to macronodular adrenocortical hyperplasia. This procedure was feasible with a single hand-assist port placed in the exact midline in the infraumbilical region.

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